ES-SALAM RESEARCH REACTOR

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Introduction:

- Es Salam is the second Research Reactor installed in Algeria after the NUR Reactor of Algiers
- Es Salam is a multi-purpose heavy water Research Reactor, with thermal power of 15 megawatts.
- The reactor was started up in July 1992.



Introduction:

• The reactor is installed in a rectangular building, it comprises four levels: under ground which shelters the equipments and three levels equipped with offices and other equipments, instruments and laboratories apparatus for the personnel exploiting the reactor. The reactor block is in an enclosure (hall of the reactor)

Experimental devices:

- Es Salam is designed to be used mainly for the production of radioelement, the doping of silicon, the analysis by neutron activation, neutron beam photography, the test of materials and for formation
- It also provides beams of neutrons for the needs of the fundamental and applied research.

The Reactor Es Salam

- tank type
- moderated and water-cooled with heavy water and graphite like reflectors.
- Use low enriched uranium.
- flow of 2x10¹⁴ n/cm² s.
- the clad is in zircaloy



The Reactor has:

- 45 experimental vertical channels of various diameters,
 - 23 in heavy water,
 - 20 in graphite and
 - 2 in the shielding water tanks.



The Reactor has:

- Two pneumatic connections which connect the analysis laboratory by neutron activation to the reactor.
- Es Salam is equipped with seven horizontal channels, 3 are already used for:

AAN, Diffraction, Neutronradiography



Safety

- Protection system
- The emergency system cooling
- Electric feeding system of help
- Auxiliary stopping device
- System of ventilation of help
- Secondary system of cooling of help



SYSTEM OF PROTECTION AGAINST RADIATION

- CONTROL OF PERSONAL DOSE
- FIXED CONTROLE
- CONTROL OF THE SURFACE CONTAMINATION
- CONTROL USING OF PORTABLE DEVICES
- CONTROL OF THE CONCENTRATION OUT OF GAS AND RADIOACTIVE DUST IN THE AIR.



SYSTEM OF PROTECTION AGAINST RADIATION

- CONTROL OF EFFLUENTS DEGAGES BY THE CHIMNEY
- TRITIUM CONTROL



System of control of process

- Monitoring and system of measurement of the sheath rupture in heavy water.
- Monitoring and system of measurement of the sheath rupture in helium.
- Monitoring and system of measurement of escapes D20 in the exchangers.
- Monitoring and system of measurement of the rupture of the capsules.
- System of amount for radioactive gases
- Systems of measurements of strong gamma 60Kev ~ 7Mev

Guarantees:

- Signature of a safeguards agreement between the AIEA and the COMENA: infcirc 401 in February 1992 within the framework of the infcirc 66
- Signature of the treaty of non-proliferation in 1995
- Signature of an agreement safeguards generalized within the framework of the treaty of non-proliferation March 1996 ratified in December 1996: infcirc 531
- Intention of the signature of the additional protocol in September 2004

Situation:

 Existance of procedures and infrastructures of decommissioning

 Currently there is not decommissioning plan for any facility

Conclusion

The design of the installation takes in account the regulations of safety rules and the protection against radiation so that the SHUT DOWN and the maintenance of safety functions and the cooling of the reactor and measurements of the radiations and the contamination are assured.